

Chapter 5 Los Vaqueros Expansion Investigation

This project would expand Los Vaqueros Reservoir in Contra Costa County, California (See Box 5-1). The project would enhance the Sacramento-San Joaquin Delta (Delta) (See Box 5-2 for a list of acronyms and abbreviations used in this section) environment, and would also improve water supply reliability and water quality for Delta water users in the San Francisco Bay Area.

Box 5-1. Why Los Vaqueros Reservoir is an Ideal Site for Expanded Storage:

- Adjacent to Delta
- Close to existing state and federal water conveyance systems
- Delta intake locations that minimize fish loss
- Surrounded by protected open space & watershed lands
- Proven ability to achieve multiple benefits with the existing Los Vaqueros Reservoir

Box 5-2. Chapter 5 Acronym and Abbreviation List

Bay Area	San Francisco Bay Area
BDCP	Bay-Delta Conservation Plan
CCWD	Contra Costa Water District
cfs	cubic foot per second
CVP	Central Valley Project
Delta	Sacramento-San Joaquin Delta
DWR	Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
IAIR	Initial Alternatives Information Report
IEEPF	Initial Economics Evaluation Report for Plan Formulation
NA	not applicable
NOI	Notice of Intent
NOP	Notice of Preparation
Reclamation	United States Bureau of Reclamation
SBA	South Bay Aqueduct
SCVWD	Santa Clara Valley Water District
SF	San Francisco
SWP	State Water Project
TAF	thousand acre-feet

Project Location

Los Vaqueros Reservoir, owned and operated by the Contra Costa Water District (CCWD), lies in the foothills west of the Delta and east of the San Francisco Bay Area (Bay Area), in Contra Costa County (Figure 5-1). It is an off-stream reservoir, meaning that it relies on water being pumped into it from another location (in this case, the Delta), rather than the reservoir being located on a river or stream and intercepting natural flows. Off-stream reservoirs have advantages in terms of maintaining fisheries and aquatic ecosystems because they do not interrupt the natural course of rivers or streams, and thus do not block fish passage. They can also have operational advantages because they are subject to fewer restrictions on storage during winter months to maintain room for flood protection. However, they generally require power inputs to pump water into off-stream reservoirs, and their ability to capture water during high flows is limited by the capacity of the pumping stations and pipelines feeding the reservoir.

Los Vaqueros Reservoir is strategically located adjacent to the Delta and in close proximity to the major state and federal water facilities exporting water from the Delta (Figure 5-2). The location of Los Vaqueros Reservoir offers significant advantages for providing regional and statewide benefits. The reservoir is centrally located near several other important water supply facilities, including the South Bay Aqueduct (SBA) and the canals that serve the San Felipe Unit of the Central Valley Project (CVP). The Los Vaqueros Reservoir Expansion Project has been designed to convey Delta water to Bay Area water agencies that receive their current supplies of Delta water through the existing facilities in the south Delta.

The expanded reservoir would also be constructed with state-of-the-art positive barrier fish screens, which create ecosystem benefits and improve water supply reliability by avoiding impacts to fish in the Delta. The existing Los Vaqueros Reservoir employs this technology very successfully in the south Delta. The expanded Los Vaqueros Reservoir could enhance water supply reliability for Bay Area water agencies that currently rely on the SBA and the San Felipe Unit, through providing increased storage, and could simultaneously create benefits for the Delta ecosystem by improving fish screen capacity for these diversions.

The reservoir is located in a largely undeveloped part of Contra Costa County and preserves open space in the greater watershed. This reservoir protects water quality and provides habitat and recreational opportunities.

Project Objectives

Existing Reservoir

CCWD constructed, owns, and operates the existing Los Vaqueros Reservoir primarily to improve water quality for CCWD customers, and to provide stored water for emergencies. The reservoir is also operated to protect fish in the Delta. The existing reservoir facilities include a 100 thousand acre-foot (TAF) reservoir, a 20,000 acre protected watershed, Delta intakes on Old River and Victoria Canal (CCWD's Alternative Intake Project, which as of June 2010 is in start-up testing), pipelines, and related facilities. A preliminary phase of the expansion project is being conducted by CCWD. The existing reservoir is going to be expanded to a total capacity of 160 TAF. This expansion does not preclude further expansion of the Los Vaqueros Reservoir, but will provide immediate increased benefits to CCWD.



Figure 5-1. Los Vaqueros Reservoir Project Location

The water storage capacity of the existing Los Vaqueros Reservoir allows CCWD to improve the water quality delivered to its customers by adjusting the timing of its Delta water diversions throughout the year to store water when the Delta is freshest, and then release that stored water later in the year to blend with higher salinity Delta water. This operation inherently shifts CCWD pumping from dry years to wetter years, and provides dry year water supply reliability for CCWD. The existing reservoir also allows CCWD's operations to accommodate the life cycles of Delta aquatic species, by limiting diversions at critical times, thus reducing species impact and providing a net benefit to the Delta environment. These are the benefits that will be extended for CCWD by expanding the reservoir capacity to 160 TAF.

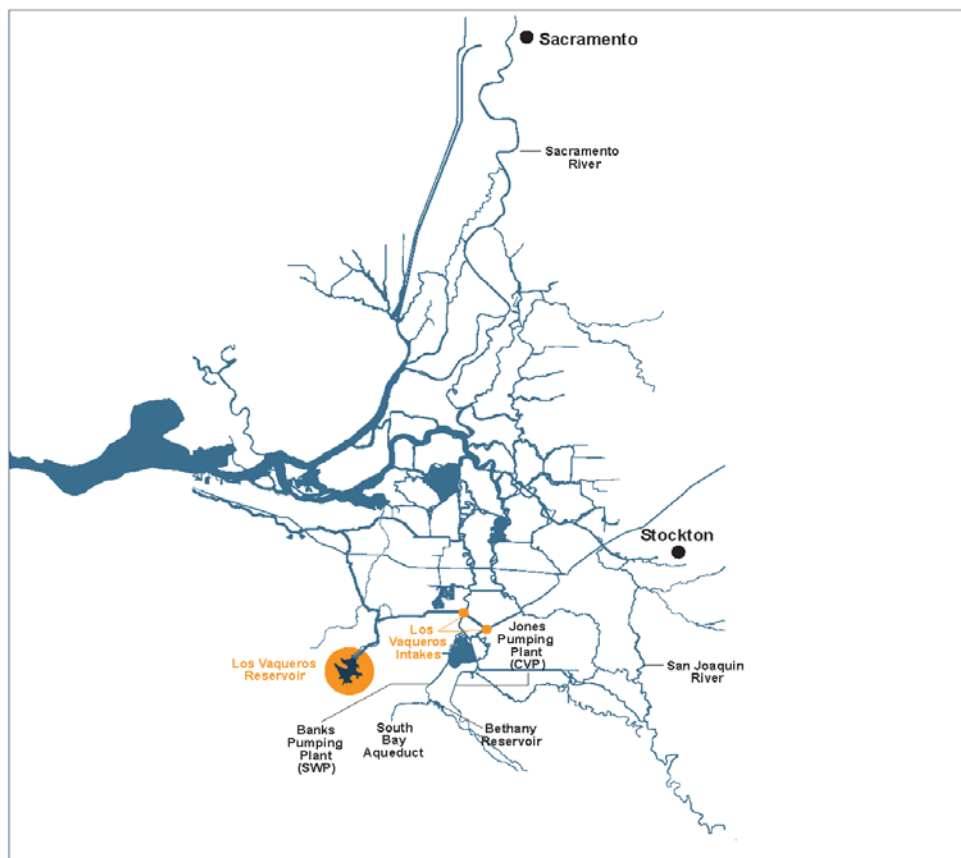


Figure 5-2. Location of Los Vaqueros Reservoir Relative to the Delta

Expanded Reservoir

Further expansion of the reservoir and related facilities would provide an opportunity to expand these benefits, and improve related system reliability and flexibility, through a cooperative effort among CCWD and other project participants. The project would include expanding the reservoir to a capacity of 275 TAF and constructing additional intake and conveyance facilities. Through the use of the expanded reservoir and related facilities, along with existing CCWD facilities and assets, and through coordinated operations with the State Water Project (SWP) and CVP, fishery protection and Bay Area water supply reliability can be substantially improved.

The Los Vaqueros Expansion Investigation objectives are to use an expanded Los Vaqueros Reservoir system to achieve the following objectives:

Primary Objectives

- Develop water supplies for environmental water management that supports fish protection, habitat management, and other environmental water needs
- Increase water supply reliability for water providers within the San Francisco Bay Area, to help meet municipal and industrial water demands during drought periods and emergencies or to address shortages due to regulatory and environmental restrictions

Secondary Objective

- Improve the quality of water deliveries to municipal and industrial customers in the San Francisco Bay Area, without impairing the project's ability to meet the environmental and water supply reliability objectives stated above

In addition to these objectives, CCWD Board of Directors' Resolution No. 03-24 (See Box 5-3) provides important guidance for identifying and evaluating plans involving the expansion of the reservoir.

Box 5-3. CCWD Board of Director's Resolution No. 03-24

In Resolution No. 03-24 the Contra Costa Water District (CCWD) Board determined "that the District will not participate in or support the CALFED Bay-Delta Program proposal for expansion of Los Vaqueros Reservoir unless the Board determines that the CALFED Bay-Delta Program proposal meets the following conditions:

1. Improves drinking water quality for CCWD customers beyond that available from the existing Los Vaqueros Project;
2. Improves the reliability of water supplies for CCWD customers during droughts;
3. Enhances Delta habitat and protects endangered Delta fisheries and aquatic resources by installing state-of-the-art fish screens on all new intakes and creating an environmental asset through improved location and timing of Delta diversions and storage of water for environmental purposes;
4. Increases the protected land and managed habitat for terrestrial species in the Los Vaqueros Watershed and the surrounding region;
5. Improves and increases fishing, boating, hiking, and educational opportunities in the Los Vaqueros Watershed, consistent with the protection of water quality and the preservation of the watershed and the watershed's unique features;
6. CCWD continues as owner and manager of the Los Vaqueros Watershed;
7. CCWD maintains control over recreation in the Los Vaqueros Watershed;
8. CCWD continues as operator of the Los Vaqueros Reservoir system;
9. CCWD will be reimbursed for the value of the existing Los Vaqueros Project assets shared, replaced, rendered unusable or lost with the expansion project and said reimbursement will be used to purchase additional drought supply and water quality benefits or reduce debt on the existing Los Vaqueros Project;
10. Water rates for CCWD customers will not increase as a result of the expansion project."

Project Formulation and Alternatives

CCWD and the Department of Water Resources (DWR) first began studying a possible expansion project in January 2001. The proposed project was developed and refined through the course of detailed studies with CCWD, DWR, and the Bureau of Reclamation (Reclamation) and extensive public outreach. Public outreach on Los Vaqueros Expansion Investigation has included 30 public meetings, 35 CCWD Board meetings open to the public, formation of a Customer/Stakeholder Feedback Group and Agency Coordination Work Group, distribution of fact sheets, press releases, postcards, and newsletters, and the maintenance of a project website (www.lvstudies.com) with documents and other related material posted for public review (See Box 5-4).

Box 5-4. Reports Related to the Los Vaqueros Expansion Investigation

Environmental Impact Statement (EIS)/Environmental Impact Report (EIR)

In February 2009, the Bureau of Reclamation (Reclamation) and Contra Costa Water District (CCWD) published a joint Draft EIS/EIR that evaluated the environmental effects of expanding Los Vaqueros Reservoir. Following a series of public hearings and extended comment period, the project team prepared a Final EIS/EIR that was released in March 2010. The final document includes responses to all comments received on the Draft EIS/EIR.

Initial Economics Evaluation Report for Plan Formulation (IEEPF)

The IEEPF (Reclamation, 2006) provides an economic and plan formulation update to decision-makers at Reclamation and the Office of Management and Budget. The IEEPF determined that expansion of Los Vaqueros is cost effective and can be implemented while meeting the CCWD Board Principles.

December 2005 Notice of Intent (NOI) and January 2006 Notice of Preparation (NOP)

The NOI published by Reclamation in the Federal Register notifies agencies of the preparation of the EIS/EIR for the project. The NOP published by CCWD describes the proposed project alternatives reviewed in the EIS/EIR and identifies the main environmental issues to be addressed during the environmental review.

November 2005 Initial Alternatives Information Report (IAIR)

The IAIR (Reclamation, 2005b) describes formulation of initial alternative plans to address the problems, opportunities, and planning objectives identified that primarily involve enlarging the Los Vaqueros Reservoir.

April 2004 Final Draft Planning Report

The Final Draft Planning Report (CCWD, 2004) presents the information developed during the planning phase of the Los Vaqueros Reservoir Expansion Studies and incorporates comments received to date.

Following preliminary planning studies that demonstrated the expansion project could result in environmental, water supply reliability, and water quality benefits, voters in CCWD's service area were asked to vote on whether CCWD should continue to study expansion of its reservoir. The 2004 advisory ballot measure won approval of 62 percent of voters.

Through the course of studying and refining the project, various alternatives were considered, including different levels of reservoir expansion (up to 500 TAF), and various pumping and conveyance configurations. A project including a 275 TAF reservoir and increased diversion and conveyance facilities was selected for evaluation in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the project, because this combination of facilities maximized public and regional

benefits while minimizing capital costs and adverse impacts to the environment. A smaller alternative, including a 160 TAF reservoir, was also evaluated. These analyses are described in detail in the Initial Alternatives Information Report (Reclamation, 2005b) and the Final EIS/EIR (Reclamation and CCWD, 2010).

The CCWD Board of Directors certified the Final EIS/EIR and approved the expansion to 160 TAF (Alternative 4 in the EIS/EIR) on March 31, 2010. CCWD is moving forward with design and construction of the 160 TAF expansion in the near term to provide immediate local benefits that include providing drought reliability, improving water quality, helping the environment, and creating jobs. Construction of the 160 TAF expansion is scheduled to begin in 2011.

Expansion of Los Vaqueros to 160 TAF in the near term would not preclude future expansion with commitments from local, state, and/or federal partners. DWR, Reclamation and other potential local partners may choose to continue to study the feasibility of a 275 TAF expansion alternative in the context of other Delta initiatives to improve Delta conveyance and better protect Delta fisheries, including long-term programs being explored in the Bay-Delta Conservation Plan (BDCP).

The example project as evaluated in this Progress Report would expand Los Vaqueros Reservoir from the planned storage capacity of 160 TAF to 275 TAF. Diversion capacity from the Delta would be increased, as would capacity of the existing conveyance facilities that move water from the Delta to the Los Vaqueros Reservoir. Figure 5-3 shows the major components of the example project.

A South Bay connection, including a new pipeline would be constructed, linking the Los Vaqueros Reservoir system to Bethany Reservoir, which serves as a forebay for the SBA, and is also connected by the California Aqueduct to the San Felipe Unit facilities in San Luis Reservoir. Three Bay Area water agencies are served by the SBA: Alameda County Flood Control and Water Conservation District, Zone 7; Alameda County Water District; and Santa Clara Valley Water District (SCVWD). SCVWD also receives deliveries of Delta water through the San Felipe Unit. The expanded Los Vaqueros Reservoir could serve these South Bay water agencies that currently receive Delta water supplies through the CVP and SWP export facilities in the south Delta, while improving system flexibility, water supply reliability, and environmental protection.

Example 275 TAF Los Vaqueros Reservoir Expansion Project Features and Costs

For the purposes of this report, the project identified as Alternative 1 in the Los Vaqueros Expansion Investigation EIS/EIR was evaluated as the example project formulation. This project would enlarge Los Vaqueros Reservoir from the planned 160 TAF to 275 TAF total capacity by raising the existing dam. In addition, it would include the features listed below. Project features are also illustrated on Figure 5-3.



Figure 5-3. 275 TAF Los Vaqueros Reservoir Expansion Project Inundation Area and Project Features

- Increase total Delta diversion capacity from 320 cubic feet per second (cfs) to 670 cfs. Five hundred cfs would come from modifying existing CCWD conveyance facilities to allow full concurrent operation of the Old River Intake and Pump Station (250 cfs) and Alternative Intake Project (250 cfs). The remaining capacity would come from a new 170 cfs Delta Intake and Pump Station. The new Delta Intake and Pump Station would be constructed on Old River south of the existing CCWD Old River Intake.
- Install a new Delta-Transfer pipeline connecting the new intake to the Transfer Facility parallel to the existing 320 cfs Old River pipeline. The new pipeline would have a capacity of 350 cfs for a combined conveyance capacity of 670 cfs between Delta intake facilities and the Transfer Facility.
- Install a pipeline parallel to the existing pipeline between the Transfer Facility and the Los Vaqueros Reservoir. The new Transfer-Los Vaqueros Pipeline would have a capacity of 670 cfs and would be used to fill the expanded reservoir and convey release flows to the South Bay connection of up to 470 cfs. The existing Transfer Pipeline would continue to be used to convey release flows to CCWD up to 400 cfs.
- Expand the existing Transfer Facility from a conveyance capacity of 200 cfs to 670 cfs and a storage capacity of 12 million gallons.
- Construct a new pipeline connecting the Transfer Facility to the SBA pump station at Bethany Reservoir with a capacity of up to 470 cfs.
- Construct a new power substation and related power conductors to provide power to the new intake and expanded Transfer Facility pump station.
- Construct new inlet and outlet pipelines at the reservoir and other ancillary reservoir facilities within the Los Vaqueros watershed (e.g., access roads, etc.).
- Replace and enhance recreational facilities that would be within the proposed inundation area.

New parallel pipelines are proposed in locations where the capacity of existing pipelines would be enlarged. Installing parallel pipelines has multiple benefits over replacing the existing pipelines, including decreased construction cost, increased operational flexibility, and the need to maintain service to CCWD during construction of the reservoir expansion. Two pipelines, rather than one larger pipeline, also provide redundancy in the event of emergencies and enable partial shutdowns for maintenance activities. A single pipeline is proposed for the South Bay connection. Because no pipeline exists in this location currently, installing a single pipeline will minimize environmental impacts and construction costs.

As calculated for the Draft EIS/EIR in 2009, the estimated capital cost for the facilities described above is \$985 million. This cost estimate includes construction costs (\$435 million), design and construction management (\$170 million), land acquisition and mitigation (\$25 million), and unlisted items and contingency (\$355 million), and is escalated to mid-point of construction (assumed to be 2014) using an assumed 4% total cost of money.

Example 275 TAF Los Vaqueros Reservoir Expansion Project Operations

The expanded reservoir would be operated in coordination with the SWP and CVP to provide environmental benefits in the Delta and water supply reliability for San Francisco Bay Area water users. Improved fish screens would be used to divert and deliver a major portion of the Delta water supply for South Bay water agencies through the expanded Los Vaqueros system and the South Bay connection. This operation would replace the existing deliveries to these agencies through the CVP and SWP Delta

export pumps. In addition, the expanded storage in Los Vaqueros Reservoir would be used to store available flows in the Delta that occur when water is abundant, and then release the stored water at later times when the stored water is most needed. This would provide water supply reliability to Bay Area water agencies that have recently had available supplies reduced due to new environmental restrictions imposed on current Delta operations, and that could also face water supply shortages in future droughts. Figure 5-4 depicts how the multiple components of the Los Vaqueros Reservoir Expansion Project combine to create substantial improvement and flexibility for fish protection, environmental water management, and Bay Area water supply reliability.

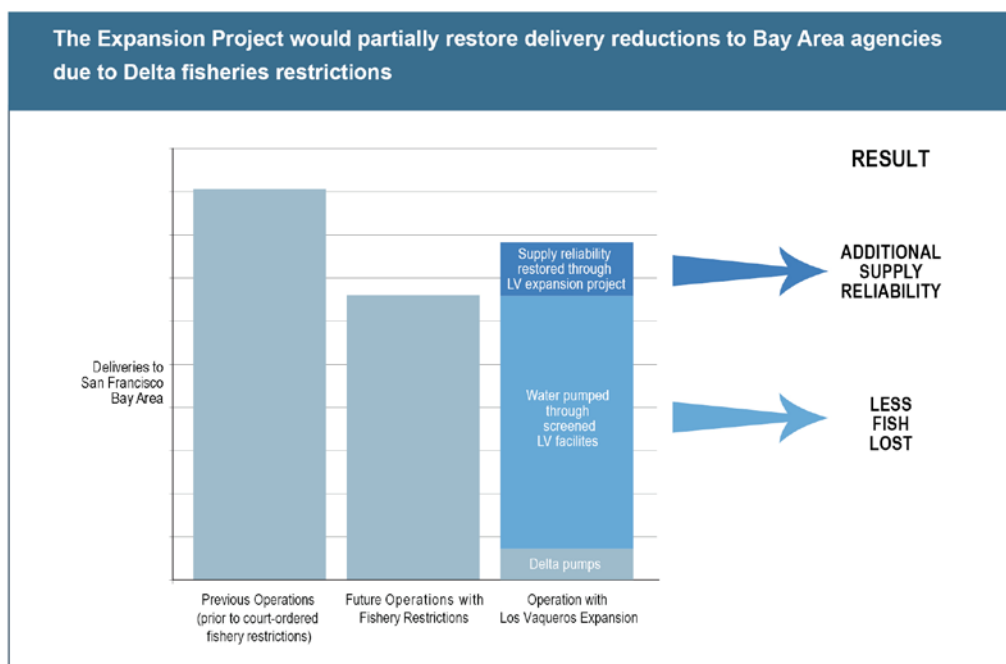


Figure 5-4. Representation of How the Multiple Components of the Los Vaqueros Expansion Investigation Combine to Achieve Project Benefits

Example 275 TAF Los Vaqueros Reservoir Expansion Project Benefits

This section describes the results of modeling conducted for the example 275 TAF Los Vaqueros Reservoir and summarizes potential project benefits, including public and non-public benefits based on guidance from the 2009 Comprehensive Water Package. A discussion of benefits of the example project is presented below according to whether the benefit would be shared by the public at large, or would be limited to a smaller group of beneficiaries. Environmental benefits are considered public, as are benefits that increase emergency preparedness. Improvements in water supply reliability for specific groups of water users are considered local, or non-public, benefits. Potential benefits of the example project are presented in Table 5-1 and illustrated in Figure 5-5.

Table 5-1. Summary of Potential Benefits for the Example 275 TAF Los Vaqueros Reservoir Expansion Project Formulation

Potential Benefits	Description	Metrics	Units	Long Term Average	Driest Periods Average
Public Benefits					
Ecosystem					
Refuge Supply	Provides Water Supply for South-of-Delta Refuges	Change in deliveries	TAF/Year	NA	NA
Fish Protection	Enables reductions in exports through Banks and Jones Pumping Plants with no water supply impacts	SF Bay Area deliveries made from storage to reduce spring diversions from Delta (Los Vaqueros no-diversion period)	TAF/Year	6	1
Fish Protection	Enables reductions in exports through Banks and Jones Pumping Plants with no water supply impacts	SF Bay Area diversions made through improved fish screens (Not including Los Vaqueros no-diversion period)	TAF/Year	147	86
Emergency Preparedness					
Emergency Storage	Improves Emergency Water Supply for water users in the SF Bay Area	Change in average storage available for delivery to local agencies in an emergency	TAF	15	2
Other Local Benefits					
Water Supply					
Reliability	Improves Water Supply Reliability for SF Bay Area SWP/CVP contractors	Change in deliveries	TAF/Year	7	2

CVP = Central Valley Project

SF = San Francisco

Delta = Sacramento-San Joaquin Delta

SWP = State Water Project

NA = not applicable

TAF = thousand acre-feet

Notes: ¹ Long Term is the average quantity for the period of Oct 1922 - Sep 2003.

² Driest Periods is the average quantity for the combination of periods of May 1928 - Oct 1934, Oct 1975 - Sep 1977, and Jun 1986 - Sep 1992.

Public Benefits

The example project formulation could provide public benefits, including ecosystem improvements, emergency storage, and recreation, as described in the following sections.

Ecosystem Improvements

Fish protection benefits result from improved fish screening through state-of-the-art positive barrier fish screens, application of a no-diversion period during the most critical times for fish, multiple intake locations to avoid fish, and added flexibility in timing the pumping curtailment at SWP and CVP Delta export facilities to provide greater fish benefits.

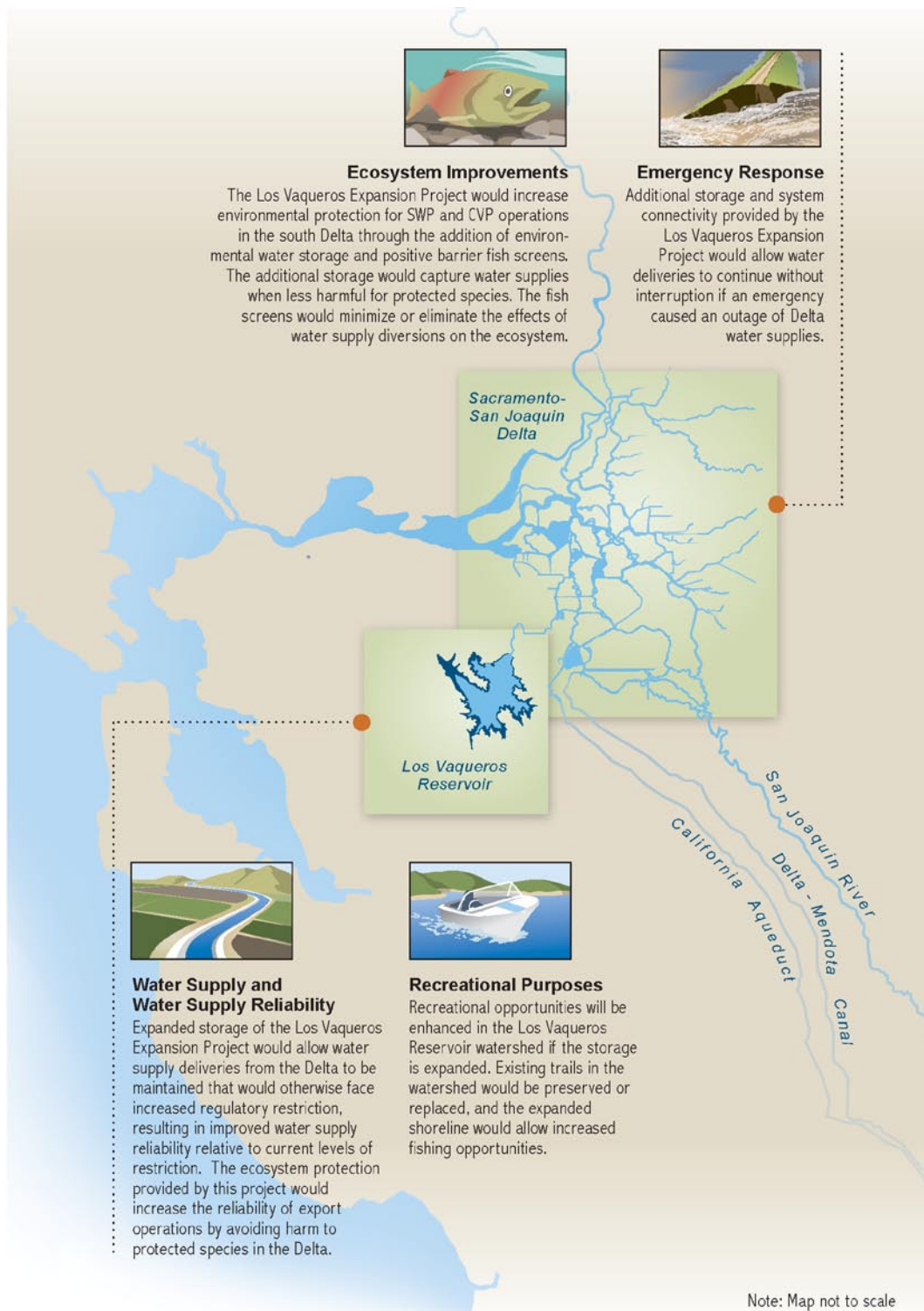


Figure 5-5. Summary of Potential Benefits of the Example 275 TAF Los Vaqueros Reservoir Expansion Project

Improved Fish Screening

The expanded Los Vaqueros system would only divert Delta water through state-of-the-art fish screens designed and operated to regulatory agency specifications. These fish screens would provide superior fish protection for diversions to meet South Bay water needs compared to the current diversions at the CVP and SWP export pumps. Diversions at the screened Los Vaqueros Reservoir system would have fewer impacts to fish than the same amount of water diverted at the SWP or CVP Delta pumps.

The locations of the reservoir's intakes in the Delta are also advantageous. Both the existing intake on Old River and the intake under construction on Victoria Canal are on the side of Delta channels, which helps enable their fish screens to perform effectively in preventing entrainment and impingement of fish swimming past compared to intakes that span a channel.

No-Diversion Period

The additional storage of the expanded reservoir would provide the operational flexibility to reduce or eliminate diversions at Los Vaqueros intakes during the most sensitive fish period without disrupting supplies. Existing Los Vaqueros Reservoir operations include a no-diversion period in the spring. During this period, CCWD water needs are met using stored water in Los Vaqueros Reservoir. Shifting the South Bay water agency diversions to the expanded reservoir system allows the application of this no-diversion period to approximately three times the current amount, while still maintaining deliveries.

Multiple Intake Locations

Water would be diverted to the expanded Los Vaqueros system through three separate Delta intakes. Multiple points of diversion and additional storage capacity, coordinated with SWP and CVP operations, would improve the flexibility of the state and federal water systems to respond to changing fishery conditions in the Delta to best protect fish.

Emergency Response/Storage

Increased stored water supplies would be available for delivery to Bay Area water agencies through the South Bay Connection or existing interties in the event of a Delta levee failure, earthquake, or other emergency.

Recreational Purposes

Recent visitor data shows that between 8,000 and 29,000 visitors come to the Los Vaqueros Watershed each year. Over 80 percent of the usage is for fishing. Other recreators visit for hiking on the 55 miles of trails and bicyclists and equestrians have the opportunity to use the multi-use trails. Other visitors utilize the interpretive center or take advantage of special educational or competitive sporting events. With the expansion project, recreation facilities affected by the inundation will be replaced and enhanced. The larger reservoir will provide additional opportunities for fishing from the shoreline and fishing piers. In addition, the existing marina will be expanded and more boats made available for use on the reservoir. The network of hiking trails will also be expanded.

Water Supply Reliability Benefits

Water supply reliability benefits result from restoring some Delta supplies lost due to current regulatory restrictions on SWP and CVP export pumping, storing water in wet years for use in dry years, and increasing available storage for emergencies.

The reservoir would continue to provide water quality benefits to CCWD. Operation of the project to provide water quality benefits for South Bay water agencies was not optimized for this analysis.

Delta Supply Restoration

Stored water supplies would be used to partially restore the delivery reductions to South Bay water agencies due to regulatory restrictions at the SWP and CVP Delta export pumps. The state-of-the-art fish screens and multiple intake locations would make deliveries less subject to uncertainties associated with curtailments at the CVP and SWP Delta export pumps. With additional storage, demands can be met with releases from the reservoir even when Delta export diversions are curtailed to protect Delta fisheries.

Dry Year Storage

The additional storage enables water to be carried over from year to year, increasing the amount of water available in dry years to South Bay water agencies and CCWD and reduces the need to purchase supplemental dry-year supplies.

Example 275 TAF Los Vaqueros Reservoir Expansion Project Benefits under an Uncertain Future

As stated previously in this report, future conditions are uncertain at this time and considered projects must be able to fulfill project objectives and provide benefits under variable future conditions. This section describes new modeling conducted for this report and presents new information on how an example expanded Los Vaqueros Reservoir could be coordinated with potential new Delta conveyance. The section also presents a qualitative analysis of the potential impacts of climate change on project benefits. The information presented in this section is for informational purposes only.

Potential Effect of New Delta Conveyance on Project Benefits

In light of the current fisheries decline in the Delta, and the related efforts to address protection of the Delta ecosystem, a future scenario with modified water conveyance facilities in the Delta was investigated. An example project formulation for the expansion of Los Vaqueros Reservoir was evaluated assuming that a conveyance facility would allow CVP and SWP diversions to be made in the south Delta or on the Sacramento River.

The physical features and operational goals of an expanded Los Vaqueros Reservoir are not anticipated to change with the development of additional water conveyance in the Delta. However, if the use of the additional conveyance causes changes in the Delta, such as altering the implementation of fishery regulations, or changing Delta water quality or Delta water supply availability, then the day-to-day operation of Los Vaqueros Reservoir could change, along with the level of benefit provided by the project. Benefits potentially provided by the Los Vaqueros Reservoir Expansion Project operated with new conveyance in the Delta are presented in Table 5-2.

The potential future Delta conveyance scenario that was evaluated would create benefits for Los Vaqueros Reservoir operations, by reducing the amount of time that fish protection flow standards limit the filling of the expanded portion of the reservoir. This effect allows increased filling of Los Vaqueros Reservoir, and increased capture of available water supply. The potential changes in project operations and benefits that would occur with the development of alternative conveyance in the Delta are discussed below for the same categories of public and other benefits presented above for the example project formulation.

Table 5-2. Summary of Potential Benefits for the Example 275 TAF Los Vaqueros Reservoir Expansion Project Formulation with New Delta Conveyance

Potential Benefits	Description	Metrics	Units	Long Term Average	Driest Periods Average
Public Benefits					
Ecosystem					
Refuge Supply	Provides Water Supply for South-of-Delta Refuges	Change in deliveries	TAF/Year	8	2
Fish Protection	Enables reductions in exports through Banks and Jones Pumping Plants with no water supply impacts	SF Bay Area deliveries made from storage to reduce spring diversions from Delta (Los Vaqueros no-diversion period)	TAF/Year	NA	NA
Fish Protection	Enables reductions in exports through Banks and Jones Pumping Plants with no water supply impacts	SF Bay Area diversions made through improved fish screens (Not including Los Vaqueros no-diversion period)	TAF/Year	115	82
Emergency Preparedness					
Emergency Storage	Improves Emergency Water Supply for water users in the SF Bay Area	Change in average storage available for delivery to local agencies in an emergency	TAF	41	16
Other Local Benefits					
Water Supply					
Reliability	Improves Water Supply Reliability for SF Bay Area SWP/CVP contactors	Change in deliveries	TAF/Year	8	13

CVP = Central Valley Project

SF = San Francisco

Delta = Sacramento-San Joaquin Delta

SWP = State Water Project

NA = not applicable

TAF = thousand acre-feet

Notes: ¹ Long Term is the average quantity for the period of Oct 1922 - Sep 2003.

² Driest Periods is the average quantity for the combination of periods of May 1928 - Oct 1934, Oct 1975 - Sep 1977, and Jun 1986 - Sep 1992.

Ecosystem Improvements

Improved Fish Screening

The benefits of fish screens at the Los Vaqueros Reservoir intakes would still provide superior fish protection for diversions to meet South Bay water needs compared to the diversions at the CVP and SWP export pumps in the south Delta. However, the added flexibility of new conveyance could allow CVP and SWP to adaptively manage water diversions to protect Delta fish. The new conveyance is also assumed to include screened intakes, which would further improve fishery protection.

No-Diversion Period

Given the potential reductions in fish entrainment in the south Delta under a future conveyance scenario, the No-Diversion period may not provide the same level of benefit that it is thought to have under current conditions. In the example project formulation modeled for the possible future conveyance scenario, the No-Diversion period was implemented for CCWD but not for the South Bay water agencies. The environmental water storage in the expanded Los Vaqueros Reservoir was instead used to make deliveries to wildlife refuges in the San Joaquin Valley.

Refuge Supply

The increased storage in the expanded Los Vaqueros Reservoir could be used to capture and store water for San Joaquin Valley wildlife refuges, or other environmental water needs. This potential benefit is enhanced by the increased ability to fill Los Vaqueros Reservoir in the future conveyance scenario.

Multiple Intake Locations

Multiple intake locations for Los Vaqueros Reservoir would still provide protection for Delta fish. The increased flexibility of CVP and SWP intake facilities would increase this benefit.

Emergency Storage

The increased stored water supplies in the expanded Los Vaqueros Reservoir under the future conveyance scenario would directly improve the potential for the expansion project to deliver emergency water supply to Bay Area water agencies through the South Bay Connection or existing interties in the event of a Delta levee failure, earthquake, or other emergency.

Recreational Purposes

Public recreational opportunities at the Los Vaqueros watershed would not be affected differently by the future conveyance scenario.

Water Supply Reliability Benefits

Delta Supply Restoration

Water supply reliability benefits designed to restore some Delta supplies lost due to current regulatory restrictions on SWP and CVP export pumping would not be necessary in the future conveyance scenario that was evaluated; the Bay Area deliveries of CVP and SWP water supply are fully restored by the conveyance scenario.

Dry Year Storage

The increased potential to fill and deliver water from the expanded Los Vaqueros Reservoir in this scenario creates an improved potential for storing water in wet years for use in dry years, and substantially improves the dry year deliveries to Delta water users in the San Francisco Bay Area.

Potential Effect of Climate Change on Project Benefits

With respect to the potential effects of climate change, the example project increases the flexibility of local and regional water supply systems to adapt to changes in water supply availability. Increasing water storage capacity and flexibility to adjust the timing and location of water diversion from the Delta improves the ability of local, regional, and state water managers to adjust water supply operations to respond to potential changes in water supply availability as well as to respond to changing environmental conditions in the Delta. Additional studies may be performed as new information and analytical tools become available. Based on current levels of information on climate change, the following climate-related effects may occur that affect the operation of Los Vaqueros Reservoir:

- Higher temperatures will decrease Sierra snowpack storage, changing runoff timing, intensity, and duration. This will affect Delta water quality and the quantity and timing of available water supply in the Delta, which would require shifts in the timing of filling and releases from Los Vaqueros Reservoir.

- Sea-level rise will continue, and may interact with the changes in runoff to further perturb Delta salinity and available water supply. The filling and releases from Los Vaqueros Reservoir would be modified to match the changing window of available water supply.
- Higher temperatures will likely increase demand for water supply in California, including the Bay Area. Increased demands in the heat of summer will correspond to a water supply that is increasingly concentrated in the winter, due to changing runoff patterns. The portion of Los Vaqueros Reservoir that is drained and refilled each year will increase to maintain water supply reliability in the new climate conditions.

The climate change analysis performed to date indicates that additional water supply storage in Los Vaqueros Reservoir will be beneficial, and will help reduce the impacts of climate change on water users served by the reservoir. This issue will continue to be studied, and updated analyses will be used to inform future decisions about reservoir design.

Los Vaqueros Reservoir Expansion Project Environmental Effects

While the project is intended to provide benefits in the areas of fishery protection in the Delta, Bay Area water supply reliability, and Bay Area drinking water quality, its implementation would result in some short-term and long-term impacts to the environment. The environmental impacts associated with the project alternatives can be generally categorized as follows: project construction; facility siting/footprint; project operations; and climate change. These potential impacts are analyzed fully and discussed in detail in the EIS/EIR prepared for the project. They are discussed briefly below.

Construction

Most environmental impacts identified for the project would be associated with project construction; these impacts would occur for up to three years and would cease once project construction is completed. Construction activities generate impacts such as noise, dust, indirect habitat disruption, temporary effects on agricultural activities, construction traffic and access disruption, and increased potential erosion and related water quality issues. The EIS/EIR identifies feasible mitigation measures to reduce all construction impacts to less than significant levels.

Facility Siting/Footprint

Facility siting or footprint effects are the permanent effects that result from locating a facility on a specific site and removing or altering what was on the site previously. These types of impacts include conversion of farmland to non-agricultural uses, and effects on biological resources and habitats, cultural resources, visual resources, or other land uses as well as the potential for increased exposure to hazards. In most cases, feasible mitigation measures have been identified to reduce these significant effects to less than significant levels.

Expanding the reservoir from 160 TAF to 275 TAF would increase the area of reservoir inundation by approximately 600 acres, from 1,900 acres to 2,500 acres. The expanded reservoir would inundate existing habitat for biological resources, including various sensitive plant and animal species; inundation primarily would affect grassland habitat but also some oak woodland, scrub, and wetland habitats. The effects of reservoir expansion on biological resources could for the most part be mitigated to less than significant levels through implementation of a habitat compensation and enhancement program that would preserve, restore, and enhance habitats of the type affected.

Dam modification and reservoir expansion would also affect cultural resources; mitigation measures have been identified to reduce these effects to less than significant levels. Relocation of existing recreation facilities and the addition of new recreation facilities proposed under all alternatives would result in relatively small footprint effects on habitats within the watershed.

Construction of the new Delta Intake and Pump Station would result in loss of up to 22 acres of farmland that is designated as important farmland by the state. The entire area along Old River is designated as such, thus the impact to this farmland is unavoidable. Mitigation would be performed to reduce this impact to less than significant. Construction of new pipelines would result in only very limited footprint impacts.

Climate Change

The Final EIS/EIR examines the potential for the project to increase greenhouse gas emissions, which in turn would contribute to global climate change effects. As a global concern, increases in greenhouse gases contribute to cumulative impacts, rather than constituting a direct impact associated with a single project. The Final EIS/EIR also reviews changes in water supply availability, sea level rise, and the potential for increased flooding caused by climate change to assess how the project might affect or be affected by these environmental changes.

Project construction and operation would result in increased greenhouse gas emissions. Construction emissions would be short-term, ceasing after three years upon project completion. Greenhouse gas emissions associated with project operation would result primarily from the purchase and use of additional electrical energy to support water diversion and delivery pumping through the expanded Los Vaqueros Reservoir system. The increase in water diversion and delivery pumping proposed under the project could be partially offset by reductions in water pumping elsewhere, specifically through the state and/or federal Delta water export systems. The project will incorporate features designed to minimize energy consumption and greenhouse gas emission.